



We cannot say that the continued use of herbicides, insecticides, and other biocides will lead to the eventual extermination of man. Neither, however, can we afford to rest easily.

Raymond F. Dasmann  
Vital Issues  
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## Forum

### Burning Border Health Issues

A small county in Arizona is plagued by unusually high rates of lupus erythematosus and cancer, and residents are looking at air and water pollution from neighboring Mexico as the culprits.

A study released last December confirmed that the population of Santa Cruz county, located along the Mexican border, suffers from 2.4 times the National Cancer Institute's expected rate of multiple myeloma, a form of bone marrow cancer, and almost twice the expected number of lupus cases. The study, conducted by the University of Arizona Cancer Center, found that there were 12 cases of multiple myeloma from 1989 to 1993 in the county of about 30,000, while the expected rate is 5 cases per 100,000 people.

The study also found 94 cases of lupus per 100,000 people, whereas 50.8 cases per 100,000 are expected. According to Brad Christensen, a spokesperson for the Arizona Department of Health Services (ADHS), this is the highest incidence of lupus cases in one area on record in the world.

The study was undertaken at the urging of residents of Nogales, the town most affected by the illnesses, to investigate the health problems. In 1992, a group of can-

cer victims and their family members who were concerned about the high rates of disease formed a grassroots organization, Living Is for Everyone (LIFE), to lobby state officials and draw attention to the problem.

"The group grew out of the need to address what we thought at the time were only health issues," said Ana Acuna, a 54-year-old lupus patient who helped form the organization. "We had a suspicion that environmental factors were involved, and from there grew the tie to the environment."

In December 1993, the governor, university officials, and ADHS officials responded to LIFE's requests and visited Nogales. "We visited Carillo Street, which is a small neighborhood, and it seemed like every other household was touched by cancer," Christensen said.

The ADHS then committed \$100,000 and contracted the university to conduct a study. Although the study did confirm that the disease incidences are unusually high, the researchers did not find an obvious link to environmental problems. However, epidemiologist Larry Clark, who headed the study, said environmental substances were probably a trigger for the lupus increase.

The residents believe the source of their health problems lies across the border in a landfill that catches on fire weekly. Burning in dumps is illegal in the United States because the practice causes air pollution and poses a health threat. The residents also blame their poor health on sewage and toxic chemicals that are carried north in a wash that runs through Nogales.

Following the release of the study, the director of the ADHS, Jack Dillenberg, took several copies to the Center for Disease Control in Atlanta to draw federal attention to the problem.

Dillenberg told *Healthlink*, a publication of the ADHS, that he felt the meetings were positive. "I want the CDC to recognize we've got some valuable data now, and I want them to get involved," he said. "Clearly this is a problem that requires solutions beyond what the city, the county, and the state can offer."

According to Christensen, the Santa Cruz community has been very pleased with the response of federal officials to date. On March 22, medical epidemiologist Rossanne Philen, of the CDC, visited Nogales and made a commitment to help further the study of the illnesses, possibly by placing a researcher on the border to look for the causes.

In addition, the Interagency Coordinating Council, which is made up of members of the EPA and the CDC, held a meeting May 2-3 in Rio Rico, which is just north of Nogales, to discuss border issues.

Mexican health officials indicated they would attend the meeting. According to Christensen, Mexican officials have responded well to the issue. Since the study was released, officials closed the dump in question and opened a new dump eight miles away that does not burn waste.

### Drink and Diet

Now there's another reason to eat your fruits and vegetables. New research conducted at the Harvard University School of Public Health shows that poor diet combined with a high intake of alcohol increases the risk of colon cancer.

Edward Giovannucci co-authored the



Mario Aguilar/Green Valley News

**Noxious neighbors?** Residents of Nogales, Arizona, believe their health problems may stem from pollution from a Mexican landfill across the border.





**Bellyache up to the bar.** A new study shows alcohol and a poor diet may increase risk of colon cancer.

study which appeared in the 15 February 1995 issue of the *Journal of the National Cancer Institute*. Giovannucci and his colleagues examined the diets of 47,931 male health professionals 40–75 years old. In 1986, the subjects, free of diagnosed cancer, filled out questionnaires about their diets. The researchers followed up on the subjects for six years, and during that time they documented 205 new cases of colon cancer.

The researchers were testing the hypothesis that diet plays an important role in the methylation of DNA, which they thought to be important in gene expression and the normal regulation of DNA, Giovannucci said. Diet controls methyl groups, which in turn control the methylation of DNA, he said. Past research has shown that methyl-deficient diets cause various cancers in animals.

The proposed mechanism by which methyl-deficient diets contribute to cancer is best understood from studies of rat hepatocarcinogenesis, the researchers reported in *JNCI*. It has been shown that a methyl-deficient diet in rats is followed by DNA hypomethylation, the overexpression of various genes including several proto-oncogenes, and elevated DNA methyltransferase activity in the liver. Rats eating a methyl-deficient diet for long periods develop liver tumors, and alcohol seems to accentuate this effect. The researchers also cited that abnormal DNA methylation patterns may contribute to carcinogenesis, possibly by influencing both the activation of oncogenes and the inactivation of tumor-suppressor genes.

The key factor in maintaining methyl groups is methionine, an amino acid found in poultry, fish, and low-fat dairy products

such as skim milk, Giovannucci said. Folate, which is found in green leafy vegetables, is also important to methyl groups, in that it assists in the production of methionine. Other dietary components such as vitamin B<sub>12</sub> and choline may relate to methyl-group availability, the researchers said.

Giovannucci and his colleagues looked at the diets to see how much methionine and folate they contained. They also looked at alcohol intake because alcohol has been shown to have suppressive effects on the metabolism of methyl groups.

The results seem to support the researchers' hypothesis. Those who had high alcohol intake combined with low intakes of folate and methionine had a relative risk of 234%, which is over twice the risk of men with low alcohol, high folate, and methionine intakes. High alcohol is defined in the study as 20 or more grams per day, which is about two drinks. Low folate intake is defined as 364 µg per day, and low methionine is 1.75 g per day.

Those who drink, but also have well-balanced diets, have about the same colon cancer risk as non-drinkers, Giovannucci

said. All types of alcoholic beverages were related to the risk of colon cancer, and past, presumably heavy, drinkers were also at higher risk of developing colon cancer, the researchers said.

The associations observed for alcohol and methionine were not due to confounding by other dietary factors, smoking, physical activity, body mass, aspirin use, differential surveillance for disease, or family history of colorectal cancer, the researchers said.

The study did suggest that aspirin use modified the risk of colon cancer even with high alcohol and low folate intake, but the researchers said this modification of risk requires confirmation in other populations. Men who took vitamin supplements also appeared to have a lower risk of cancer, but Giovannucci warned that pills are no substitute for nutrient-rich food.

"We think overall that the results support the recommendation to eat lots of fruits and vegetables. Obviously, there are other reasons, but if someone follows these guidelines, he or she will also be benefiting regarding colon cancer," Giovannucci said.

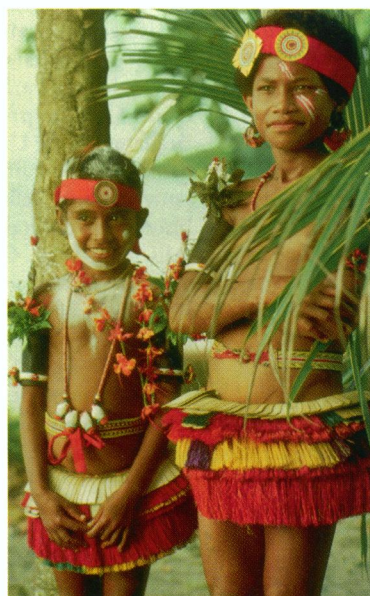
Colon cancer afflicts about 150,000 men and women every year in about equal numbers and kills 60,000 per year, making it the second leading cause of cancer deaths. Giovannucci added that after the age of 65, a woman is just as likely to die from colon cancer as from breast cancer.

Giovannucci and his colleagues are currently conducting the same study in women, and Giovannucci says the effects appear to be similar so far. In the future, he says, the researchers hope to better understand the mechanism of DNA methylation.

## Nature's Medicine Cabinet

With support from federal agencies and pharmaceutical companies, scientists are trying to tap nature's medicine cabinet while preserving the plants that stock it. How best to do this was the subject of a two-day conference on Biodiversity and Human Health, held in April in Washington, DC.

Western physicians and traditional healers alike rely on compounds found in plants to treat a wide variety of ills. Pharmaceutical companies now regularly test and develop the ingredients of plants for use in drugs. But plant species are



**People and plants.** A recent conference on biodiversity and human health stressed protection of indigenous people and plants.